A minimalist view on inflectional paradigms:
the expression of person and number in subjects and objects

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1. Introduction

The notion of inflectional paradigm has been used for centuries, and even longer.[1] Everyone who ever looked into a classical grammar book knows the kind of tableaus in which inflectional paradigms are represented. But it is still unclear how inflectional paradigms are best accounted for in linguistic theory, and it is (rightly!) disputed whether inflectional paradigms are genuine theoretical objects.

An inflectional paradigm is a set of inflectional forms of a lexical item (or 'lexeme') L, ordered according to the functional categories these forms express. For instance, {*dieser*, *diesen*, *diesem*, *dieses*, ... } is a subset of the forms of the German demonstrative *dies-* 'this', associated with the categories masculinum, singular, as well as nominative, accusative, dative, or genitive, in this order. More precisely, an inflectional paradigm can be seen as a set of <form, function> pairs of L, each determining possible syntactic contexts of L. <*diesen*, m.sg.acc> is one of the pairs belonging to the paradigm of *dies-*; it can be combined only with a m.sg noun and is accepted only in an accusative context.

Inflectional forms result from the concatenation of stems and affixes (as in $dies_{stem}$-en_{suffix}), and they usually contrast with other forms showing different affixes. The information of an affix can be derived from the contrast with forms that lack this affix (but possibly have different affixes), and therefore should be specified by a feature with a positive value. All features are assumed to be binary; they are mostly orthogonal to each other, i.e., they define independent dimensions (but some co-occurrence restrictions are possible on semantic or language-specific grounds). The features are organized within domains such as person, number, gender, tense, aspect, case. If there are affixes that characterize the most unmarked member of a domain (3rd person, singular, present tense, nominative), they are only specified for the domain, such as [ ]$_{pers}$ for a 3rd person affix, or [ ]$_{case}$ for a nominative affix. For instance, *-er* in *dieser* bears the single feature [+m] (= [+m]$_{gend,numb,case}$), whereas *-es* in *dieses* (which can even be reduced to *dies*) only contributes the information [ ]$_{gend,numb,case}$. Affixes can also bear a contextual condition that specifies the circumstances under which the affix applies (conditions of phonological, morphosyntactic, or semantic nature). For instance, *-t* in *er singt* 'he sings' (present indicative) could be specified as [ ]$_{pers,numb}$/−past,−conj, or simply as −Φ, where Φ is a variable that ranges over all the relevant features. Similarly, *-s* in *he sings*, which is the only affix in the English verb conjugation, is characterized by −Φ.

Languages differ in the amount they exploit the available features in their lexical inventory. Two features in a domain allow for four feature combinations, but often not all of them are instantiated by the morphemes of a language. (1) illustrates this with two examples. English lacks the 1st inclusive person (+1,+2), which is possible in Quechua (1a). This example also shows that inflectional morphology in one language can correspond to syntactic composition in another language. Another example is the structural case of verb complements, which can be decomposed by the case features [+hr] 'there is a higher role', and [+lr] 'there is a lower role' (Wunderlich 1997a). There are a few languages (such as the

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[1]   Lieb (2003) presents an overview about the history of the notion of paradigm, as well as useful conceptual clarifications.

Australian language Thangu) that realize all four possible cases, namely dative [+hr,+lr], accusative [+hr], ergative [+lr], and nominative [ ]$_{case}$. German lacks the ergative, Basque lacks the accusative, and Hindi lacks a distinct dative.

(1) Systematic inventory gaps
  a. Posessor person

Cuzco Quechua (Lakämper 2000:112)				English		
	+2	−2			+2	−2
+1	libro-nchis	libro-y		+1		my book
−1	libro-yki	libro-n		−1	your book	his/her book

  b. Morphological case

Thangu (Schebeck 1976:520f)				Hindi		
	+hr	−hr			+hr	−hr
+lr	yu:l-Ku man-DAT	yu:l-Tu man-ERG		+lr		bacce-ne child-ERG
−lr	yu:l-Na man-ACC	yu:l man.NOM		−lr	bacce-ko child-ACC	baccaa child.NOM

In the ideal paradigm, one function is associated with one form (2a). However, there are deviant cases in which several functions are associated with one form; this form must be underspecified. (2b) shows a paradigm with syncretism.

(2) No syncretism   Syncretism

a.	f1	f2	f3
fct1	○		
fct2		○	
fct3			○

b.	f1	f2	f3
fct1	○		
fct2	○		
fct3	○		

Syncretism can result from the poverty in the set of affixes; certain combinations of features have to share the same form. (7) illustrates this kind of syncretism with the forms available for the German definite article and the demonstrative 'this'. Feminine and plural are distinct only in the dative, and masculine and neuter are distinct only in the nominative and accusative; *-en* is the only accusative suffix. [2]

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[2] Acc/nom syncretism in the neuter is found in all Indo-European languages. It results from the restriction that inanimate nouns, which are expected as objects, should not be marked for accusative (to be captured by the constraint *(+hr)/−anim 'Avoid accusative with inanimate nouns'). This restriction has been grammaticalized for neuters (which are inanimate by default), and has then been more generalized in German (Wunderlich 2003). The feature [+N] for the genitive marks that it is a structural case for nouns; genitive and accusative can be identical. The features [+N] and [+lr] are often summarized under the notion 'oblique' (apparently, a variable over secondary case features). Various descriptions of the paradigm in (7) have been proposed in the literature, see, among others, Blevins 1995, 2000, Wunderlich 1997b, Müller 2002. The most simple assumption is that *die/diese* has to instantiate the variable [+φ] (by either +f or +pl, because +m is more specifically realized by the masculine forms (+m)).

(3)   Inventory-based syncretism in the German definite article and demonstrative

	neuter [ ]gender	masculine [+m]	feminine [+f]	plural [+pl]
nominative [ ]case	das	der	die	
accusative [+hr]	das	den	die	
genitive [+hr,+N]	des	des	der	
dative [+hr,+lr]	dem	dem	der	den

	neuter [ ]gender	masculine [+m]	feminine [+f]	plural [+pl]
nominative [ ]case	dieses	dieser	diese	
accusative [+hr]	dieses	diesen	diese	
genitive [+hr,+N]	diesem	diesem	dieser	
dative [+hr,+lr]	diesem	diesem	dieser	diesen

The various nominal elements, including also the attributive adjective, the numeral, the personal pronoun and the noun, often have similar affixes with the same function; therefore one can establish a generalized affix paradigm. However, the German affix paradigm suffers from various reductions. In the German noun, only the affixes *-s* (gen.m/n) and *-n* (dat.pl) remained.

It is possible that the stem itself occupies one of the cells of a paradigm. This is expected for the most unmarked feature combination (nom.sg of a noun, or 3sg of a verb). It is not a trivial fact that this happens in the past of the German verb, and that the stem, such as *kam* 'come.PAST' in (4a), also covers the reading 1sg. Another feature of modern German is that only the irregular verbs allow for distinctive forms in the conjunctive because they have distinctive stems; in all regular verbs the conjunctive form is identical with the respective indicative form, and therefore analytical forms have developed, as shown in (4b).

(4)   Syncretism in the German verb
    a. Past

	+2	−2
+pl	kam-t	kam-en
−pl	kam-st	kam

    b. Conjunctive

3s 'come' irregular with stem alternation		
	+past	−past
+conj	käm-e	komm-e
−conj	kam	komm-t

1s 'laugh' regular without stem alternation		
	+past	−past
+conj	würd-e lach-en CONJ-1/3s laugh-INF	
−conj	lach-t-e	lach-e

Another type of syncretism does not result from the lack of morphemes, and this is the type I will be mainly concerned with in this article. I will consider subject-object paradigms in three different native American languages (Kutenai, Plains Cree, and Quechua); they all show remarkable syncretism in the combination of 1st and 2nd person. It is only rarely possible to express 'we see you_pl' or 'you_pl see us' transparently, although there exist enough affixes to do so. Therefore, I consider the lack of affixes in the actual forms to be *gaps*.

The first question is: *Why appear these gaps*? Typically they are forced by the poverty of affix positions. If, for instance, every suffix of a certain type must be stem-adjacent, only one suffix can be realized (SINGLE SUFFIX). Most of these alignment restrictions are language-specific.

The next question is: *Which of the available affixes is selected*? The answer is mostly related to a preference scale, e.g., to a person hierarchy such as $1 > 2 > 3$. According to this hierarchy, the 1st person (plural) suffix is selected. In this simple case, we can also make the statement: 'It is better to align the (plural of the) 1st person to the stem than (that of) the 2nd person.'

Subject-object paradigms generally constitute a rather complex case: each form must bear some information about both subject and object: role, person, and number. The most important condition for these forms is that all reverse combinations (α-subject/β-object vs. β-subject/α-object, with α, β ranging over person and number) should be encoded differently (i.e., they should be 'output-distinct'). In the example above we have to know whether the 1st person affix relates to subject or object. In general, preference can be given to one of the roles (subject or object, possibly relativized to a person), or to one of the persons, or to a plural of one of the persons or one of the grammatical roles. All these possibilities are offered by a simple combinatorics, however, the languages may choose among these multiple preferences in different ways. As I will show, the person-related rankings can be different for prefixes (proclitics) and suffixes, and they can even vary in a small dialect area.

These subject-object paradigms are also interesting for methodological reasons. They give some empirical insight into what a theoretical account of paradigms has to consider, and rule out other approaches proposed in the literature (unless different types of paradigms are accounted for by different approaches).

2. The theoretical framework

Adapting ideas from optimality theory (OT), both the emergence of lexical items (including affixes) and the formation of actual forms can be regarded as determined by several competing constraints. Different rankings of the constraints induce variation.

Constraints that enable affixes of a certain category cannot predict their actual shape; the learner must learn these items, which he does by reanalyzing the complex forms he has memorized. Once he has acquired the set of affixes (themselves <form, function> pairs) he is able to utter inflectional forms more purposeful. In principle, many different combinations are possible, but not all of them are attested. Whether this or that is an actual form depends on how the constraints are ranked.

The general idea is this: Candidate inflectional forms are freely concatenated on the basis of the morpheme inventory available. A set of (partially) ordered constraints determines which of the candidates is optimal for realizing a particular intended (or input) feature complex (for short, i-features). Clearly, the candidates (or output forms) are measured according to the categories they express overtly, but possibly also according to their phonological shape, and allomorphs may be generated which have a more acceptable syllable or stress structure and thus can pass the phonological constraints more easily.

There are mainly three types of morphological constraints:

(5)   Major types of morphological constraints:
• Faithfulness constraints

- Markedness constraints
- Alignment constraints

Faithfulness constraints control expressivity, i.e., whether an input feature is visible on the output form; examples are MAX(+f) 'Realize the feature [+f] in the output', and IDENT(f) 'The value of the feature f in the output should be identical with that in the input'. Markedness constraints serve for economy, i.e., they block the abundance of certain features in the output form: *(+f) is read as 'Avoid the feature [+f] in the output'; this type of constraint is the natural counterpart to MAX(+f). Both types of constraints can be relativized to some other feature in the context. Finally, alignment constraints control the ordering of morphemes; they require, for instance, that some type of affixes should be adjacent to the stem, and some other type of affixes wordfinal.

It is an open matter of discussion of whether a fourth type of constraints should be accepted:

(6)   Distinctivity constraints.[3]
       Certain features should have distinct output-exponents: *O-IDENT(f1,f2)

Distinctivity constraints can also be read as interpretive constraints; for instance, *O-IDENT(+1,+2) could be read as 'No single form should allow both 1st person and 2nd person readings.' Another important constraint of this type is *O-IDENT($\alpha\to\beta$, $\beta\to\alpha$) 'No single form should allow readings with α subject/β object and β subject/α object' (called ASYMMETRY in Wunderlich 2001b: 249).

Since the exponents of different i-features can collapse into one form through syncretism, one has to distinguish between several i-forms (optimal for realizing a single i-feature complex) and only one o-form. If one wants to express 'we came' in German (i_1=[+1,+pl]), *kamen* is the optimal i_1-form, and if one wants to express 'they came' (i_2=[−1,−2,+pl]), the same word form *kamen* is the optimal i_2-form. Hence, *kamen* is a common o-form, with o= [−2,+pl]. Because this form is underspecified, it can be used for both 1p and 3p in the syntax.[4] Compare the following coordinations: (7a) is perfectly grammatical, whereas both options of (7b) are ungrammatical.[5]

(7)   a.   Entweder wir oder sie gewinnen.
             'Either we or they will win.'
       b.   Entweder wir oder ihr *gewinnen/*gewinnt.
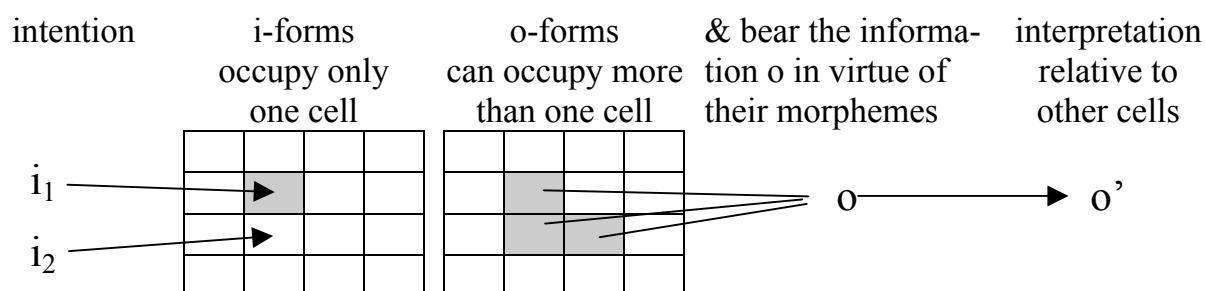   'Either we or you$_{pl}$ will win.'

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3   These constraints belong to the class of so-called output-output (o-o) constraints, which have been much discussed in the phonological literature. Krämer (2001) argues that vowel harmony should be accounted for by O-IDENT constraints. Concerning inflectional morphology, rules of referral (Zwicky 1985, Stump 1993, 2001) are a classical device of the O-IDENT type. Although I do not sympathize with rules of referral (Wunderlich 1996b, 2003), I could accept *O-IDENT constraints, which serve gradually for both expressivity and economy. For instance, *O-IDENT(+1,+2) is weaker than {MAX(+1), MAX(+2)} because it does not require that the features themselves are realized, but it is stronger than *(+1) or *(+2).

4   Morphological underspecification can often be resolved in the syntax. In German, a language with 'poor' inflectional morphology, each person-inflected verb must be accompanied by a syntactic expression of the subject. Languages with 'rich' morphology do not have this requirement.

5   Since conflicts like in (7b) often happen, a resolution procedure could be developed, according to which one of the two options is easier accepted.

Generally, the information of an o-form (in virtue of the morphemes that constitute this form) can be underspecified (o $\subseteq$ i). Output forms with few information can nevertheless obtain a richer interpretation if they are contrasted with other forms. For instance, German *kam* 'come.PAST' adapts to the interpretation 'come [−2,−pl,+past]' in the paradigm (4a). Therefore, the optimal interpretation o' of an o-form can be more specific than o (o $\subseteq$ o'). This scenario is visualized in figure (8).

(8)   The mapping from intention (speaker-perspective) to interpretation (hearer-perspect.)

| intention | i-forms occupy only one cell | o-forms can occupy more than one cell | & bear the information o in virtue of their morphemes | interpretation relative to other cells |

The abstract frame of paradigms is projected by the internal structure of feature domains, and i-(form) paradigms fill such a frame. The actual or o-(form) paradigm can show various gaps and syncretism. The question is of whether the distribution of these infelicities in paradigms is a genuine object of morphological theory. Under the perspective that particular constraint rankings determine which forms occupy the cells of an i-paradigm and to what extent these forms are underspecified, o-paradigms turn out to be epiphenomena. However, the issue is more complex. Since the speaker's intention can be more specific than the actual forms to be uttered (o $\subseteq$ i), and the hearer's interpretation can be more specific than what he hears (o $\subseteq$ o'), there is some reason to regard paradigms as interesting phenomena. To what extent can the forms of a paradigm be less specified (o) than both i and o'? Is it, for instance, possible to insert just the stem in one of the cells of an inflectional paradigm and nevertheless guarantee rich enough an interpretation?

A good point for illustration is the Macedonian paradigm in (9), which is characteristic for regular a-verbs; other verbs have a separate stem, or at least a separate theme vowel in the aorist (which happens to be -*a*). If one considers the aorist to be the unmarked [+past] form, the imperfect is the marked category. All the shadowed cells of (9) include the stem of the verb.

(9)   Macedonian default conjugation of verbs (*gleda* 'look'; Elson 1989)

	Present	Past	
		Imperfect (+durative)	Aorist
1s	gled-am	gleda-v	
2s	gleda-š	gleda-še	gleda
3s	gleda		
1p	gleda-me	gleda-v-me	
2p	gleda-te	gleda-v-te	
3p	gleda-at	gleda-a	

Obviously, Macedonian conjugation shows heavy syncretism in the past: A difference between aorist and imperfect is only marked for 2s und 3s, but here, no difference is marked with respect to person. This paradigm structure results from minimization: past is marked by

-v only if there is no separate person morpheme (such as *-a* or *-še*), and *-še* is the only specific marker for imperfect. The best candidate for being expressed by the stem itself is 3s, therefore the role of *gleda* and *gledav* in the past could not be reversed. On the other hand, certain important distinctions are still preserved: plural and singular are distinct, 1st and 2nd person are distinct, and past and present are distinct (with one violation in 3s). Under the further assumption that 1st person should never be less marked than 3rd person, one could even consider *-še* to be a general person marker in the past. Thus, the structure of the past paradigm can in principle be explicated in terms of global constraints.

With this preparation, the mapping shown in (8) can be illustrated by the past singular forms in Macedonian.

(10)   The mapping from intention to interpretation in a Macedonian subparadigm

i			i-forms	o-form	o		o'
+2,−pl,+dur	⇒		gleda-še	gleda-še	$[+dur]_{pers}$	⇒	−1,−pl,+dur
−2,−1,−pl,+dur			gleda-še				
+1,−pl,±dur			gleda-v	gleda-v	+past	⇒	+1,−pl,+past
+2,−pl,−dur	⇒		gleda	gleda	[ ]	⇒	−1,−pl,−dur
−2,−1,−pl,−dur			gleda				

If there is so much difference between what the form expresses (o) and how it gets interpreted (o'), the lexical entries could be better adapted. (Recall that [−pl] need not be part of the lexical entries because there exist more specific plural suffixes.) The suffix *-še* could be given the lexical entry [−1,+dur], despite of what one prefers for theoretical reasons ('Do not specify by means of negative features'). Less evident is it to give *-v* the lexical entry [+1,+past] because it is also found in 2p. Most problematic is it to associate the stem *gleda* with inflectional information whatsoever, although fortunately only negative feature values are involved. There are certainly more such problematic cases.

Bidirectional OT (Blutner 2000) intends to integrate both the speaker- and the hearer-perspective, and thus should be able to account for all global nature of paradigms. At the time being, such an enterprise is quite programmatic in the field of inflectional morphology. There are only a few constraints that could be read as interpretive ones (the distinctivity constraints, see above). If it is true that understanding imitates the generation of forms, no specific hearer-perspective must be added, and unidirectional OT would be sufficient to explain all the deficiencies appearing in o-forms ordered to paradigms, but the 'structure' of o-paradigms themselves need not bother us. I will return to this issue in the end of the paper.

In the following I will illustrate how the minimalist view on inflectional paradigms works, by addressing some problems in the expression of person and number when a verb marks more than one argument by inflectional means. A first illustration concerns implementations of the person hierarchy in Kutenai, a North-American isolate. In section 4, examples from Plains Cree (an Algonquian language) illustrate that the distinction of several types of person-related hierarchies is necessary. Section 5 deals with an interesting variation in the number marking of Quechua. Finally, section 6 presents a more detailed analysis of the highly syncretistic paradigm of Cochabamba Quechua. In the course of my expedition I will also discuss the various possibilities by which subject and object of a verb are identified morphologically. 'Subject' always refers to the higher argument of a transitive verb (often an agent or experiencer), and 'object' to the lower one (often a patient).

3. Person-plural preferences in the subject-object paradigm of Kutenai[6]

The tableau in (11) shows the inflectional forms of transitive verbs in Kutenai; V represents a variable verb stem (e.g., *wūkat* 'see'), and all differences come from personal (or pronominal) suffixes and proclitics, representing the arguments of the verb; in the indicative (with past reading) a final suffix *–ni* appears. A verb form such as *hu-wūkat-is* 'I saw you' already represents a full sentence. In all subject-object tableaus given in this article, the information about subjects (the highest argument) is given in columns, and that about objects (the lowest argument) in rows. Actually there are four dimensions: person and number for both subject and object. A notion such as '2p' decomposes the information characteristic of one of the arguments. '2p' is short for the feature combination [+2,+pl], and '2p→1p' is short for the feature complex <[+2,+pl,−hr], [+1,+pl,+hr]>, and thus characterizes the information to be expressed in a complex form, but possibly also the information of a single portmanteau morpheme. Here, as well as in all following tableaus, the cells with 1→1 and 2→2 are disregarded because there exist separate reflexive morphemes. However, in the case of 3→3 two different 3rd person referents are possible.

(11) Person-plural in the verb paradigms of Kutenai (Dryer 1991, cited from Zúñiga 2002)

O\S	1s	1p	2s	2p	3
1s			hin=V-ap	hin=V-ap-kił	V-ap
1p			hin=V-awas		V-awas
2s	hu=V-is	hu=V-awas			V-is
2p	hu=V-is-kił				V-is-kił
3	hu=V	hu=V-ała'	hin=V	hin=V-kił	several forms
itr.	hu=V	hu=V-ała'	hin=V	hin=V-kił	V-∅

Let us first consider the lexical entries. One can see from the tableau that the proclitics *hu=* and *hin=* always relate to 1st or 2nd person subject, whereas the suffixes *-is* and *-ap* relate to 1st or 2nd person object, hence are accusative morphemes, glossed by 'A'. By contrast, the plural morphemes *-kił* and *-awas* can mark either subject or object; *-kił* applies only in addition to another 2nd person morpheme, and *-awas* competes with *-ała'* in the 1st person plural. One of the two 1p-morphemes must be restricted. *-ała'* is used in the direct setting 1p→3 and with intransitive verbs, *-awas* is used in the inverse setting 3→1p and in all local settings (with 1st and 2nd person exclusively). Therefore, *-awas* is the more specific morpheme; it operates both in accusative contexts and in contexts in which another local person (the 2nd person) is involved.[7]

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7   One could try to describe the second context in which *-awas* operates by reference to a person hierarchy; two such options come into mind: (i) There is another person involved, which is not lower on the hierarchy 1,2 > 3. Accordingly, in 1p→2 a non-lower person is involved, and *-awas* applies, while in 1p→3 a lower person is involved, and *-awas* does not apply. (ii) There is another person involved, which is higher on the hierarchy 2 > 1 > 3. Accordingly, *-awas* only applies in 1p→2. – The latter option conflicts with the hierarchy 1,2 > 3, which obviously holds for the clitics, while the former option poses some problem with the negation. (In an intransitive

(12) The lexical inventory (forms, glosses, features)
  a. hu=   1   [+1]
      hin=   2   [+2]
  b. -ap   1sA   [+1,+hr]
      -is   2A   [+2,+hr]
  c. -kił   p/2   [+pl]/+2
      -ała'   1p   [+1,+pl]
      -awas   1p   [+1,+pl,+hr] ∨ [+1,+pl]/[+2,+hr]

No further morphemes do play a role here, except in 3→3 (see below). In particular, there is no 3rd person morpheme available.

The paradigm in (12) shows two remarkable instances of syncretism with respect to 2nd person: 2s/p→1p and 1p→2s/p. Obviously, this syncretism does not result from a lack of morphemes because 2s and 2p are distinguished both as subjects and as objects when they are combined with a 3rd person. Even more astonishing is the asymmetry between the two instances of syncretism, which becomes evident if one considers the information contributed by the individual morphemes.

(13)   The information of Kutenai verb forms

O\S	1s	1p	2s	2p
1s			2=V-1sA	2=V-1sA-p/2
1p			2=V-1p	
2s	1=V-2A	1=V-1p		
2p	1=V-2A-p/2			

The form occupying the cells 2s/2p →1p only lacks information of number, while the form occupying the cells 1p→2s/p lacks any information about 2nd person, unless one also considers the contextual information of -*awas* given in (12c).

One can try to understand such a situation as being forced by an interplay of several competing constraints. The constraints that seem to play a role are listed in (14): (a) There is an obvious preference for 1st person plural. (b) The number of suffixes is restricted. Only -*kił* can follow one of the other morphemes, but it cannot follow -*awas*, which itself is plural; only one plural suffix is allowed. (c) The ordering of suffixes is restricted: a 1st person suffix must be stem-adjacent. (d) Clitics are pure subject markers; they express only the person of the subject. (e) In general, however, every local person should be expressed. (f) An object should be realized by an accusative morpheme. (g) All expression of person or number is costly. – One can conceive of more constraints, which, however, are less relevant for the result.

(14) a. MAX(+pl)/+1 » MAX(+pl)/+2.
        'It is more important to express the plural of a 1st person than that of a 2nd person.'
      b. ALIGN(+pl,R,word).
        'Align [+pl] with the right edge of a word.' (SINGLE PLURAL)
      c. ALIGN(+1,R,stem) » ALIGN(+2,R,stem).
        'The 1st person is realized nearer to the stem than the 2nd person.'

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verb, no other person is involved, thus, it would be true that no lower person is involved.) Nevertheless, the reader should keep in mind that -*awas* shows some trace of an inverse-marking system (see below).

    d. CLITIC = (MAX(local)/–hr)$^{\text{clitic}}$
       'Realize the local person of the highest argument by a clitic.' (In other words, clitics are pure subject markers.)
    e. CLITIC » MAX(local)
    f. MAX(+hr) » *(+hr)
    g. *φ, where φ ranges over all person-number features realized on a form

Once one has hypothesized these constraints, one has to bring them in a certain ranking. In the beginning, all constraints are equally important, but as soon a violation of a constraint by an existing form is detected, this constraint has to be lower ranked than the others. In the following evaluation tableaus, various candidate forms are compared. A dotted line indicates that the constraints do not differ in ranking, whereas a solid line indicates that they do. Every violation of a constraint is marked by '*'; it is followed by '!' if this violation rules the respective candidate form out. The winning candidate is designated by a pointing hand.

    (15a,b) show that a highly underspecified form such as *hu*=V-*awas* (1=V-1p) nevertheless turns out to be optimal for expressing 1p→2 under the given constraint ranking. Every candidate that expresses 2$^{\text{nd}}$ person overtly is ruled out by one of the four dominating constraints. The reverse constellation 2p→1p is considered in (15c), here, *hin*=V-*awas* is the winner.

(15)   Selection of the optimal candidates for Kutenai verb forms.

a.

1p→2s	CLITIC	MAX (pl)/1	AL(pl, word)	AL(1, stem)	MAX (+hr)	MAX (local)	MAX (pl)/2	AL(2, stem)	*(+hr)	*φ
☞ hu=V-awas 1=V-1p					*	*				***
hu=V-is-awas 1=V-2A-1p				*!					*	****
hu=V-awas-is 1=V-1p-2A			*!					*	*	****
hu=V-is 1=V-2A		*!							*	**
hin=V-awas 2=V-1p	*!				*					***

b.

1p→2p	CLITIC	MAX (pl)/1	AL(pl, word)	AL(1, stem)	MAX (+hr)	MAX (local)	MAX (pl)/2	AL(2, stem)	*(+hr)	*φ
☞ hu=V-awas 1=V-1p					*	*	*			***
hu=V-is-awas 1=V-2A-1p				*!			*		*	****
hu=V-is-kił 1=V-2A-p/2		*!							*	****
hu=V-awas-kił 1=V-1p-p/2			*!		*					*****
hu=V-kił-awas 1=V-p/2-1p			*!	*	*					*****

c.

2p→1p	CLITIC	MAX (pl)/1	AL(pl, word)	AL(1, stem)	MAX (+hr)	MAX (local)	MAX (pl)/2	AL(2, stem)	*(+hr)	*φ
☞ hin=V-awas 2=V-1p					*		*			***
hin=V-ap-kił 2=V-1sA-p/2		*!							*	****
hin=V-awas-kił 2=V-1p-p/2			*!		*			*		*****
hin=V-kił-awas 2=V-p/2-1p			*!	*	*					*****

Recall that two different person-related hierarchies have been assumed to achieve this result. In the realization of person by a clitic, the hierarchy 1,2 > 3 is relevant (with no distinction between 1st and 2nd person), while in the realization of plural the hierarchy 1 > 2 is decisive.

What happens when 3→3 settings have to be expressed? Surprisingly, in all these situations the relative salience of arguments must be encoded. A 3rd person can be proximate, obviative, or further obviative (obv'), and in any constellation of two 3rd persons one must be more salient than the other. Generally, human beings are more salient than non-humans, animates are more salient than inanimates, and a discourse topic is more salient than a non-topic. (16) shows the four possible verb forms in 3→3 settings. (Note again that each of these forms can be uttered as a full clause. Specifying noun phrases can be added; then, an obviative argument usually is also marked by *-s* on the noun.)

(16)   Variants of 'he sees him' (or 'she sees her') in Kutenai

O\S	prox	obv	obv'
prox		wūkat-aps-i see-INV-IND	
obv	wūkat-i see-IND		wūkat-aps-is-ni see-INV-OBV-IND
obv'		wūkat-s-i see-OBV-IND	

The two suffixes appearing in these verb forms are *-aps*, an inverse marker, and *-s*, the obviative marker, with the lexical entries given in (17).

(17)   Inverse and obviative marker in Kutenai
    a. -aps   INV   +hs/–hr
    b. -s   OBV   +obv/–hs

The function of these two markers is shown in (18). According to a natural bias, the subject of a verb usually is more salient than the object (it is more likely to be animate or human, more likely to be specific or definite, and more likely to be discourse-prominent). Relative salience is expressed by the relational feature [+hs] ('there is an argument that is higher in salience'), similar to the role feature [+hr] ('there is a higher role'). In the more natural setting, the two features [+hs] and [+hr] coincide; in other words, the object is the less salient argument by default. The inverse marker *-aps* assigns the feature [+hs] to the higher role, and thus reverses the natural bias. By contrast, the obviative feature [+obv] is an absolute feature; it assigns a lower salience status to just one of the arguments; more precisely, it assigns this status to the more salient argument, whichever it is. With only *-s*,

the subject becomes obviative, but because it remains more salient than the object, the latter is downgraded to further obviative. If *-s* follows the inverse marker, the object becomes obviative, but it still remains more salient than the subject, so that the latter is downgraded to further obviative. The two affixes together thus constitute a flexible system that allows any kind of ranking among at least three referents.

(18)   The function of inverse and obviative marking

direct settings				inverse settings			
V	λy +hr +hs	λx −hr	VERB(x,y)	V-aps	λy +hr	λx −hr +hs	VERB(x,y)
V-s	λy +hr +hs	λx −hr +obv	VERB(x,y)	V-aps-s	λy +hr +obv	λx −hr +hs	VERB(x,y)

If a dog and a woman participate in a predication, the woman is inherently more salient than the dog, therefore the inverse form must be used to express that the dog is biting. Without the inverse marker, the sentence in (19) would get the reading 'a woman bit a dog'.

(19)   Pałkiy   n'it'x-naps-i   xa'łcin-s.
       woman   bite-INV-IND   dog-OBV
       'A dog bit a woman.'

Interestingly, if one compares the forms in (16) with those in (20), repeated here as full forms, one sees that some of the affixes are similar: *-aps* (inverse) and *-ap* (1A), as well as *-s* (obviative, often realized as [is]) and *-is* (2A).

(20)   Some forms with accusative marking in Kutenai

O\S	1s: hu=	2s: hin=	3
1s		wūkat-ap-ni see-1A-IND	
2s	wūkat-is-ni see-2A-IND		wūkat-is-ni see-2A-IND
3	wūkat-i see-IND		

In the literature the question has been discussed whether *-aps* is derived from *-ap* and *-s* (Morgan 1991, Dryer 1991: 197). However, we could as well ask whether the two accusative morphemes are derived from the inverse and the obviative marker. Assuming the two person hierarchies in (21), the inverse marker makes the object to be more salient (e.g., proximate); similarly, the 1A marker makes the object to be the highest person. The obviative marker (in the inverse case) makes the object to be of lower salience; similarly, the 2A marker makes the object to be a lower person. This suggests that markers of the inverse system may have been reinterpreted.

(21)   Person hierarchies in Kutenai
          a. prox > obv > obv'
          b.   1   > 2 > 3

Note, however, that an accusative marker is generalized to role; it operates regardless of the person in the subject. With 2A, the subject can be 1st or 3rd person. Thus, the shift from an inverse-marking system to a case-marking system involves generalization that destroys all

former relatedness to person. Regretfully, the facts available are too a poor for making any conclusive argument.

Summarizing, one can state the following: (i) Besides a flexible inverse system in the 3rd person, Kutenai has accusative morphemes for 1st and 2nd person. (ii) The accusative system is incomplete because all plural marking refrains from clear accusative: The 2p marker -kił operates under the condition that a 2nd person marker is present, and the 1p-marker -*awas* operates under two contextual conditions: one is accusative, and the other one refers to 2nd person (showing some traces of an inverse system). (iii) 1st person is preferred in both plural marking and alignment with the stem, while in the pro-clitics the two local persons are equally ranked. All this indicates that the grammatical system of Kutenai is in a stage of reorganization. Moreover, the identity in form suggests some reinterpretation of affixes. In my view, it is more likely that an inverse system adapts case rather than a case system shifts to an inverse one.

4. Different types of person-related hierarchies in Plains Cree (Algonquian)

The Algonquian languages display the inverse type we have found in the 3rd person of Kutenai for all persons. Cree is (besides Ojibwa) the largest and also the best documented language of this family. In Plains Cree,[8] but similarly also in Potowatomi (Hockett 1948), one finds the same two instances of syncretism as in Kutenai, namely 2s/p→1p and 1p→2s/p. The paradigm shown in (22) (Wolfart 1973: 41f; Dahlstrom 1991: 21f.) does not include the forms with obviative or inanimate arguments.

(22)   Independent forms of transitive animate verbs in Plains Cree (selection) [9]

O\S	1s	1p	2s	2p	12	3s	3p
1s			ki-V-i-n	ki-V-i-nāwāw		ni-V-ikw-w	ni-V-ikw-w-ak
1p			ki-V-i-nān			ni-V-iko-nān	ni-V-iko-nān-ak
2s	ki-V-iti-n	ki-V-iti-nān				ki-V-ikw-w	ki-V-ikw-w-ak
2p	ki-V-iti-nāwāw					ki-V-iko-wāw	ki-V-iko-wāw-ak
12						ki-V-iko-naw	ki-V-iko-naw-ak
3s	ni-V-ā-w	ni-V-ā-nān	ki-V-ā-w	ki-V-ā-wāw	ki-V-ā-naw	Only one 3rd person can be singular or plural, a further 3rd person must be obviative
3p	ni-V-ā-w-ak	ni-V-ā-nān-ak	ki-V-ā-w-ak	ki-V-ā-wāw-ak	ki-V-ā-naw-ak	
itr.	ni-V-n	ni-V-nān	ki-V-n	ki-V-nāwāw	ki-V-nānaw	V-w	V-w-ak

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8   Plains Cree is spoken by 35,000 or more speakers in North central Manitoba westward across Saskatchewan and central Alberta to the foot of the Rocky Mountains, and also in USA (1982 SIL).

9   Transitive verbs that take animate objects have a different stem from those that take inanimate objects; the latter show a much simpler inflection. Independent forms are used in matrix clauses. Underlying /w/ is reduced to $\varnothing$ in the environment C_#, and the sequence /w-i/ is realized as [o] in the environment C_C. E.g., /-ikw-w/ shifts to [-ik], and /-yēkw-ik/ shifts to [-yēkok].

Before we discuss the syncretism, a few words are necessary with respect to the argument linking type of Plains Cree. There is only one set of person and number morphemes (prefixes and suffixes), and they apply in a fixed order regardless of whether they mark the subject or the object. Different to Kutenai, the prefixes do not encode the person of the subject; instead, whenever a 2nd person participant is involved, the prefix is *ki-*; this suggests the hierarchy 2 > 1.

The grammatical function of the person-number morphemes is exclusively regulated by the theme suffixes, directly attached to the stem. The tableau in (23) represents also theme markers that are not visible from (22); some further forms with two obviatives are still neglected.

(23) Theme markers in Plains Cree (independent forms)[10]

O\S	2	1	3	obv	inanimate
2		-iti	-ikw		
1	-i				
3	-ā				
obv	-im-ā		-ē	more forms	

The suffixes in the upper right represent inverse markers, while those in the lower left represent direct markers, which are more differentiated, but mostly consist in a single vowel. It is obvious that *-ikw* has been generalized to all inverse settings, except the setting of two local persons. The various theme markers (especially the direct ones) can be considered to be generalized from portmanteau morphemes that include information about both subject and object. Both *-i* and *-iti* are quite specific as 2→1 or 1→2, respectively, whereas *-ā* signals local→3 more generally; *-im* is an obviative marker for objects.

The function of these theme markers is shown in (24); they assign to either the higher role or the lower role the feature +hp 'there is a higher person' (realized on the respective other argument role). A direct marker preserves the natural bias in the distribution of person, whereas an inverse marker inverts it. All further affixation of person morphemes must be compatible with these salience values.

(24)   λy   λx   VERB(x,y)
                         +hr   −hr
        -ā   +hp   direct
        -ikw   +hp   inverse

This argument linking device has been fully generalized. Any two arguments must differ in their person values. For local person the ranking is 2 > 1, and for the 3rd person it is proximate > obviative > further obviative > inanimate.[11] The full set of theme markers is given in (25).

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[10] With inanimate objects, a different stem is selected, and the theme vowel is *-ē* with local subjects.

[11] Thus, the inanimates are included in the set of persons.

(25) Theme markers
direct	-ā	local→3	+hp/+hr
	-i	2→1	+hp,+1/+hr
	-ē	3→3obv	+hp,+obv/+hr
inverse	-ikw	INV	+hp/–hr
	-iti	1→2	+hp,+1/–hr

Nearly the same markers are also found in the conjunct (or dependent) forms, except that there is no distinction between *-ā* and *-ē*. A theme marker is lacking only in a few forms (those that are related to 3rd person combined with a local singular person). However, the personal suffixes differ radically from those in the independent forms, and they are more differentiated in both 1s and 2s. In contrast to the independent forms, conjunct forms do not have a person prefix; in the aorist, all forms begin with the conjunct marker *ē-* or *kā-*,[12] followed by the verb stem, both is neglected in (26).

(26) Plains Cree aorist conjunct forms (selection); only the suffixes are represented

O\S	1s	1p	2s	2p	12	3s	3p
1s			-i-yan	-i-yēkw		-it	- it-ik
1p			-i-yāhk			-iko-yāhk	-iko-yāhk-ik
2s	-it-ān	-it-ahk				-isk	-isk-ik
2p	-it-akok					-iko-yēkw	-iko-yēkw-ik
12						-iko-yahkw	-iko-yahkw-ik
3s	-ak	-ā-yāhk	-at	-ā-yēkw	-ā-yahkw		
3p	-ak-ik	-ā-yāhk-ik	-at-ik	-ā-yēkw-ik	-ā-yahkw-ik		
itr.	-yān	- yāhk	-yan	- yēkw	- yahkw	-t	-t-ik

Remarkably, the conjunct forms show the same two instances of syncretism as the independent forms (see also Wolfart 1973:55); (27) repeats these forms with the verb wāpam 'see'.

(27) Syncretism in Plains Cree

2s/p→1p		1p→2s/p	
ki-wāpam-i-nān	ē-wāpam-i-yāhk	ki-wāpam-iti-nān	ē-wāpam-it-āhk
2-see-DIR-1p	CONJ-see-DIR-1p	2-see-INV-1p	CONJ-see-INV-1p

The independent forms begin with *ki-* because the 2nd person is preferred (2 > 1), while the conjunct forms begin with the aorist marker. However, the plural suffix in all the forms given in (27) is 1p, and the conjunct forms only specify 1st person, thus showing a true person gap. Considered from the point of expressivity, it is well motivated that the hierarchy in the plural forms is reversed to that in the person prefixes; this guarantees that at least the independent forms never show a person gap. Thus, the two person-related hierarchies of Plains Cree do not follow from one hierarchy.

(28) Two types of person-related hierarchy in Plains Cree
    a. MAX(+2) » MAX(+1) for prefixes
    b. MAX(+pl)/+1 » MAX(+pl)/+2 for suffixes

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[12] Aorist conjunct forms marked with *kā-* are also found in matrix clauses. The simple conjunct forms lack any prefix; they are used with a subjunctive, iterative, or future imperative suffix.

The constraints that force to make a selection between 1st and 2nd person, are again alignment constraints:

(29) a. SINGLE PREFIX (= ALIGN(local,L,stem)): 'Local person prefixes are attached directly to the stem.'
  b. SINGLE LOCAL PERSON SUFFIX (= ALIGN(local,R,stem)): 'Local person suffixes are attached directly to the stem.'
  c. ALIGN(+hp,R,stem): 'Theme markers are attached directly to the stem.' (This constraint dominates ALIGN(local,R,stem).)

It is worthwhile to note that the inventory of personal suffixes in the conjunct forms is more differentiated than in the independent forms, probably because the absence of personal prefixes has to be counterbalanced. (30) shows that all forms expressing local↔local, 3↔obv or obv↔obv combinations use a theme marker (inverse or direct), while all forms expressing a combination of a local and a 3rd or obviative person lack a theme marker, and use different 1s and 2s suffixes.

(30) Singular conjunct forms in Plains Cree

O\S	2s	1s	3s	obv
2s		it-ān (INV)	-isk	-iy-isk
1s	i-yan (DIR)		-it	-iy-it
3s	-at	-ak		-iko-t (INV)
obv	-im-at	-im-ak	-ā-t (DIR)	-ā-yi-t / -iko-yi-t

Together with a theme marker the same suffixes are used as in intransitive verbs, and, interestingly, with preference for the subject (!). The suffixes that replace the theme markers are portmanteau suffixes; I call them 'quasi-ergative' and 'quasi-accusative' because they are possible candidates for becoming generalized as case morphemes. Compare with the true accusatives found in Kutenai.

(31) Local singular affixes in the conjunct forms of Plains Cree

	intransitives, and with theme marker	quasi-ergatives		quasi-accusatives		true accusatives in Kutenai	
2s	-yan 2s	-at	2s→3	-isk	3→2s	-is	1/3→2s
1s	-yān 1s	-ak	1s→3	-it	3→1s	-ap	2/3→1s

Table (26) above shows a further portmanteau suffix, namely *-akok*, which occurs in the single combination 1s→2p together with the inverse morpheme. Thus, the theme markers, being generalized from portmanteau morphemes, do not exclude other more specific portmanteau morphemes in general. But only if such a more specific portmanteau morpheme replaces the theme marker, it could be reinterpreted as a case marker.

    In the combinations with an obviative the forms in (30) show either *-iyi* or *-im*; the former is a general [+obv] marker, while the latter is an [+obv] marker for the object, hence, apparently an accusative morpheme. This marker has to be stem-adjacent, but surprisingly it can be combined with a following direct theme marker, with *-ā* in the prox→obv' cell of the tableau in (32), or with *-ē* in the respective independent form *wāpam-im-ē-w*.[13] The tableau

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[13] Recall that stems with inanimate objects differ from those with animate objects; one could consider –im to be an element that forms stems with a (further) obviative object.

in (30) represents all conjunct forms with 3rd person only. It is instructive to compare it with the tableau (16) for Kutenai, which shows the same organization of obviative forms (except that DIR and the expression of 3rd person are lacking).

(32)   Variants of 'he sees him' in Plains Cree conjunct

O\S	prox	obv	obv'
prox		wāpam-iko-t see-INV-3	
obv	wāpam-ā-t see-DIR-3		wāpam-iko-yi-t see-INV-OBV-3
obv'	wāpam-im-ā-t see-OBV-DIR-3	wāpam-ā-yi-t see-DIR-OBV-3	

I have argued above that portmanteau morphemes can be either generalized to inverse/direct markers or to case morphemes. The pressure for reinterpretation is higher in the conjunct forms, which lack a separate person prefix, than in the independent forms. Central Ojibwa, with about 7,000 speakers in central Ontario, is another Algonqian language in which one can observe the creation of case. The independent forms, shown in (33), are rather regularized, all morphemes are similar to those found in Plains Cree. (Rhodes 1976: 175f,182f, 186f,190f, cited from Zúñiga 2002)

(33)   Independent forms of transitive animate verbs in Central Ojibwa (selection)

O\S	2s	1s	3s
2s		g-wābam-ini 2-see-1→2	g-wābam-igw 2-see-INV
1s	g-wābam-i 2-see-2→1		n-wābam-igw 1-see-INV
3s	g-wābam-ā 2-see-DIR	n-wābam-ā 1-see-DIR	more forms

But the conjunct forms in (34) are different. Obviously, the direct marker *-i* (2→1) of the independent system is generalized and operates now also in 3→1, hence, has become a true accusative morpheme. Similarly, the inverse marker *-ini* (1→2) has developed to 2nd person accusative (consider the 1s→2s and 3s→2p cells), but it still competes with portmanteau forms in other combinations; note that *-agogw* (1s→2p) is a form that also exists in Plains Cree (*-akok*).

(34)   Conjunct forms of transitive animate verbs in Central Ojibwa (selection)

O\S	2s	1s	3s
2s		wābam-inin-ān see-2A-1s	wābam-ik see-3→2s
2p		wābam-agogw see-1s→2p	wābam-inin-ēgw see-2A-2p
1s	wābam-i-an see-1A-2s		wābam-i-d see-1A-3
3s	wābam-ā-d see-DIR-3		more forms

The reader will notice that a new syncretism has evolved (1s/2s→3s), in which the expression of a 3rd person object is preferred, to be captured by the ranking MAX(person)/+hr »

MAX(person)/−hr. This ranking also allows to split the 1p→2s/p syncretism (so that the resulting forms have a subject gap!), while the eastern dialects preserve the syncretism, see (35). These examples also illustrate that 'accusative' is still a rather instabile category in Ojibwa.

(35)   Split of syncretism in Eastern Ojibwa (Rhodes 1976: 86,116, cited from Zúñiga 2002)

	Central Ojibwa	Eastern Ojibwa
	Central Ojibwa	Eastern Ojibwa
O\S	1p	1p
2s	wābam-igw-an see-INV-2s	wābam-inin-āng see-2A-1p
2p	wābam-igw-ēgw see-INV-2p	

Summarizing, we can see that Plains Cree and Kutenai share certain features: (i) They use the same organization of obviative forms, an inverse marker and the feature [+obv]. (ii) They have proclitics or prefixes to mark local person, but they do it differently. (iii) They have developed special suffixes to mark the grammatical role of a local person, true accusatives in Kutenai, and 'quasi-case' in Plains Cree conjunct forms. (iv) Both suffer from alignment constraints so that the overt expression of 1pl-2pl settings is excluded, and they share the constraint-ranking MAX(+pl)/+1 » MAX(+pl)/+2 for making the decision, which is, as we can add at least for Plains Cree, independent of the person hierarchy used for other purposes. (v) Ojibwa adds to this picture some reorganization in the set of conjunct forms, the creation of true accusatives and a different constraint ranking for person. (vi) In general, direct/inverse markers seem to be generalized from portmanteau morphemes, but can themselves be reinterpreted as case morphemes.

One can argue that some Algonquian languages and Kutenai were in historical contact and therefore could have borrowed some of the shared features from each other. The most probable candidate for an exchange is the obviative morpheme alongside with inverse marking in the 3rd person, a less probable candidate is the reorganization of 1st and 2nd person singulars. But for a number of reasons, an 'abstract' borrowing of a constraint ranking is quite implausible. In a situation where the speakers and the language learners are under a certain pressure to make decisions, the emergence of such constraint rankings is expected. In the following section, I will sketch the situation in Quechua in which a great variation of constraint rankings has evolved, even in a small dialect area.

5. Variation of person-number marking in Quechua

The Quechuan dialects (or rather languages) have been spread over a large area along the South American Andes, from Ecuador in the north via Peru and Bolivia down to Argentina in the south; they are now scattered among Spanish and Aymara speaking people and have not much contact with each other. A similar dialect situation as found today already existed at the time of the arrival of the Spaniards. Quechua is interesting for us because one can see how paradigms can radically be shifted under the influence of a few factors.

Lakämper (2000) compared the inflectional systems of 10 Quechuan languages. She found that 'you see me' is nearly identically expressed in all of theses languages, while 'we see you (pl)' is expressed in at least nine structurally different ways. QI, and QII a/b/c refer to the classification of Quechuan languages by Torero (1964).

(36)   'You_{sg} see me' and 'We see you_{pl}' in Quechua (Lakämper 2000: 1)

	2s→1s 'you see me'	1p→2p 'we see you (pl)'
Ancash (Central Peru) QI	*rika-ma-nki* see-1A-2	*rika-ya-q* see-pl-1→2
Ferreñafe (Northern Peru) QIIa	*rika-ma-nki* see-1A-2	*rika-shu-ni-zhapa* see-2A-1-pl
Cajamarca (Northern Peru) QIIa	*rika-ma-nki* see-1A-2	*rika-yki-llapa* see-1→2-pl
Ayacucho (Southern Peru) QIIb	*riku-wa-nki* see-1A-2	*riku-yki-chik* see-1→2-pl/2
Cuzco-Apurimac (Southern Peru) QIIc	*riku-wa-nki* see-1A-2	*riku-yki-ku* see-1→2-pl
Cuzco (after Middendorf) QIIc	*riku-wa-nki* see-1A-2	*riku-yki-chis-ku* see-1→2-pl/2-pl
Potosí (Bolivia) QIIc	*rikhu-wa-nki* see-1A-2	*rikhu-yki-chis* see-1→2-pl/2
Norte de Potosí (Bolivia) QIIc	*rikhu-wa-nki* see-1A-2	*rikhu-su-yku-chiq* see-2A-1p-pl/2
Cochabamba (Bolivia) QIIc	*rikhu-wa-nki* see-1A-2	*(qan-kuna-ta) rikhu-yku* you-pl-ACC see-1p

One reason for the multiplicity of forms expressing 1p→2p is due to effects of the person hierarchy 1 > 2 > 3. The inverse setting 2→1 is always transparently expressed by means of an object (accusative) morpheme, while the corresponding direct setting 1→2 is often expressed by a portmanteau morpheme. In the inverse settings, including 2→1, 3→1, and 3→2, the object is higher on the hierarchy than the subject, which can be characterized by the feature [+Lp] ('there is a lower person'), assigned to the object. All other settings are direct, i.e. [−Lp]. The relevant constraint, then, is the following.

(37)   *(+hr)/−Lp. 'Avoid any object marking on the verb if there is no other person lower on the hierarchy.' [14]

This constraint belongs to the class of constraints that characterize differential object marking (objects are only marked, if their value is less expected), and it can be derived by harmonic alignment of the two scales +hr > −hr and +Lp > −Lp. As one of the consequences, 3rd person object morphemes do not exist. Obviously, this constraint is not violated by a portmanteau morpheme because it does not bear any accusative feature. Some Quechuan languages have reranked the constraint, such that the 2A morpheme can be used also in the

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[14]   Lakämper & Wunderlich (1998: 127) proposed an Object-Subject Constraint (OSC) with a similar function: "The object may be marked separately from the subject only if it refers to a person that is higher on the hierarchy of person than the person to which the subject refers." Note that the languages using an inverse feature differ of whether 3→3 combinations are included or not. In Quechua, 3→3 combinations do not allow an overt object marking, but no graduality is involved in the 3rd person (as in Algonquian); therefore, the relevant inverse feature is [−Lp] 'there is no lower person' rather than [+hp] (with −Lp ⊇ +hp). Note that Quechua marks accusative on nouns with *−ta*, without any restriction.

situation of 1p→2p (Ferreñafe and Norte de Potosí), even if a portmanteau morpheme 1→2 exists (as in Norte de Potosí).

The other, and even more important, reason for the multiplicity of forms expressing 1p→2p has to do with number. The Quechuan languages differ in the position of the plural suffix (stem-adjacent in QI, verbfinal in QII) as well as in the number of plural suffixes (only one in QI and QIIa, at least two in all others). Moreover, most Quechuan languages allow only one plural to be expressed, while some allow more than one.[15]

(38)   *pl-pl. 'Avoid more than one plural to be expressed.' (SINGLE PLURAL)

If only one plural can be expressed, there must be some selection of the winner, and thus further variation is expected. Lakämper found four varieties within Cuzco, where the choice of plural depends on either person or grammatical role (or both). See (40) below.

Consider first the changes in the inventory of plural morphemes. -*yku* appears first with personal pronouns (Ayacucho, QIIb), extends then to nouns and intransitive verbs (Cuzco, QIIc), and finally generalizes to all verbs. Potosí fuses *n-ku* (3-pl) to a single plural marker -*nku* (3p), but looses -*yku* as a marker for personal pronouns, whereas Santiago del Estero generalizes the three-way plural marking to all constructions. The notation '1p' means that the suffix expresses both 1st person and plural, while 'pl/1' means that the suffix is added to another suffix that already expresses 1st person.[16]

(39)   The spread of plural morphemes in Quechua IIb and IIc

	Ayacucho	Cuzco	Potosí	Norte de Potosí, Cochabamba	Santiago del Estero (Argentina)
with personal pronouns	-yku pl/1 -kuna pl	-yku pl/1 -kuna pl	-kuna pl	-yku pl/1 -kuna pl	-kichis pl/3- -yku pl/1 -kuna pl
as possessor on nouns and with intransitive verbs	-chik pl/2 -ku pl	-yku 1p -chis pl/2 -ku pl/3	-yku 1p -nku 3p -chis pl/2	-yku 1p -nku 3p -chis pl/2	-yku 1p -nku 3p -chis pl/2
with transitive verbs	-chik pl/2 -ku pl	-chis pl/2 -ku pl	-yku 1p -nku 3p -chis pl/2	-yku 1p -nku 3p -chis pl/2	-yku 1p -nku 3p -chis pl/2

(40) shows 8 varieties of plural selection within Quechua IIb and IIc. For each of these varieties, the crucial constraint rankings that account for the distribution of plural morphemes are also noted. The reader can easily verify these rankings from the given glosses.

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[15]   In the most conservative Quechua dialects QI (such as Ancash), plural directly attaches to the verbal stem, which suggests that it originally marked the number of events rather than the number of one of the arguments. This would motivate why SINGLE PLURAL plays a role. As far as there is only one plural marker, this constraint is also motivated by 'Avoid haplology'.

[16]   In the Indoeuropean languages, person and number are mostly fused in one affix. As we have seen already in the preceding sections, many of the native American languages have person affixes without number information, and number affixes without person information. Hence, a number affix such as -*ku* in Ayachucho and Cuzco can be related to one or the other argument. If, however, person and number are adjacent they can fuse to one single affix. Whether this happens or not, has been carefully controlled in Lakämper's description. That -*chis* (pl/2) remains a separate affix results from the fact that it can follow either -*nki* (2) or -*yki* (1→2).

(40) a. Ayacucho: *pl-pl, MAX(+pl)/+hr » MAX(+pl)
'The plural of an object gets preference over the plural of a subject.'

O\S	1p	2p	3p
1p		-wa-nki-ku 1A-2-pl	wa-n-ku 1A-3-pl
2p	-yki-chik 1→2 -pl/2		su-nki-chik A-2-pl/2

b. Cuzco 1: *ku-ku, MAX(+pl) » ...
'Express plural, but avoid the sequence of two identical morphemes.'

O\S	1p	2p	3p
1p		-wa-nki-chis-ku 1A-2-pl/2-pl	wa-n-ku 1A-3-pl
2p	-yki-chis-ku 1→2 -pl/2-pl		su-nki-chis-ku A-2-pl/2-pl

c. Cuzco 2: *pl-pl, MAX(+pl)/+1 » MAX(+pl)/+2 » MAX(+pl)
'Express plural of the higher person in the hierarchy 1 > 2 > 3.'

O\S	1p	2p	3p
1p		-wa-nki-ku 1A-2-pl	wa-n-ku 1A-3-pl
2p	-yki-ku 1→2 -pl		sunki-chis 3→2 -pl/2

d. Cuzco 3: *pl-pl, MAX(+pl)/+2 » MAX(+pl)
'The plural of a 2nd person gets preference over all other plurals.'

O\S	1p	2p	3p
1p		-wa-nki-chis 1A-2-pl/2	wa-n-ku 1A-3-pl
2p	-yki-chis 1→2 -pl/2		sunki-chis 3→2 -pl/2

e. Cuzco 4: *pl-pl, MAX(+pl)/+1,–hr » MAX(+pl)/+2 » MAX(+pl)
'It is most important to express the plural of a 1st person subject.'

O\S	1p	2p	3p
1p		-wa-nki-chis 1A-2-pl/2	wa-n-ku 1A-3-pl
2p	-yki-ku 1→2 -pl		sunki-chis 3→2 -pl/2

f. Potosí: *pl-pl, MAX(+pl)/+hr » MAX(+pl)
Recall that Potosí applies -yku (1p) also to transitive verbs.
'The plural of an object gets preference over the plural of a subject.'

O\S	1p	2p	3p
1p		-wa-yku 1A-1p	wa-yku 1A-1p
2p	-yki-chis 1→2 –pl/2		sunki-chis 3→2 -pl/2

g. Norte de Potosí: *yku/nku* » MAX(+pl)
   'Express plural, but avoid any combination of *-yku* and *-nku*.'

O\S	1p	2p	3p
1p		-wa-yku 1A-1p	wa-yku 1A-1p
2p	-su-yku-chiq 2A-1p-pl/2		su-nku-chiq 2A-3p-pl/2

h. Cochabamba: ??

O\S	1p	2p	3p
1p		-wa-yku 1A-1p	wa-yku 1A-1p
2p	-yku 1p		sunki-chis 3→2 –pl/2

Particularly surprising is Cochabamba, in which both 1p→2p and 2p→1p exhibit a gap in the 2nd person. Let us study this system to more detail.

6. The subject-object paradigm of Cochabamba

(41) shows that in the transitive verbs of Cochabamba 1p subjects are always realized by *-yku*, and 1p objects always by *-wa-yku*, regardless of the person-number value of the other argument. Obviously, the requirement of marking 1p outperforms all other MAX-conditions regarding person, number or role.

(41) The full transitive affix paradigm of Cochabamba (present tense) (Lakämper 2000:151)

O\S	1s	1p	2s	2p	3s	3p
1s			-wa-nki	-wa-nki-chis	-wa-n	-wa-nku
1p			-wa-yku			
2s	-yki	-yku			-sunki	-su-nku
2p	-yki-chis				-sunki-chis	
itr.	-ni		-nki	nki-chis	-n	-nku

From these inflectional forms we can easily identify the set of morphemes given in (42). The intransitive forms show that *-chis* differs from the other plural markers in that it assigns plural to a preceding 2nd person, which also happens in most of the Quechua dialects.

(42) The inventory of Cochabamba morphemes
   a. object markers: -wa   1A
                       -su   2A
   b. portmanteaus: -yki   1→2
                       -sunki   3→2
   c. person markers: -ni   1s
                       -nki   2s
                       -n   3s
   d. plural markers: -yku   1p
                       -nku   3p
                       -chis   pl/2

It is obvious that there exist enough morphemes to express the combinations with 1p subject or object more transparently. In order to derive the paradigm entries in (41) as the optimal ones, all other MAX-constraints must be ranked below MAX(pl)/1, and there must be reasons to block overt combinations of the morphemes. To the constraints already introduced I add the following one, which is phonotactic in nature. [17]

(43) *iy/k_k. The diphthong [iy] is excluded in the environment k_k.
  Thus, forms such as *ri.khu-y.**ki-y.ku** or *ri.khu-wa-n.**ki-y.ku** are not allowed.

In the tableaus given in (44), the first two evaluations, (44a) and (44b), show that both MAX(person) and MAX(+pl)/+2 rank lower than other constraints (and thus can be violated), while (44c) shows that these two constraints rank higher than both MAX(+hr)+2 and MAX(+pl)/3 (and must not be violated). Finally, (44d) shows that *su-nku* is a form that doesn't violate any constraint. Candidates that violate MAX(+hr)/+1 are always worse than those that do not.

(44) Evaluations of some transitive Cochabamba forms

a.

1p→2p	*pl-pl	*(+hr) /−lp	*iy/k_k	MAX (pl)/1	MAX (+hr)/1	MAX (pers)	MAX (pl)/2	MAX (+hr)/2	MAX (pl)/3
☞ -yku -1p						*	*	*	
-yki-chis -1→2-pl/2				*!				*	
-yki-yku -1→2-1p			*!				*	*	
-su-yku -2A-1p		*!					*		
-yku-chis -1p-pl/2	*!					*		*	

With 1p subjects, *-yku* is the winner. All other candidates are ruled out by at least one of the dominating constraints. This result can easily be generalized for other person-number values of the object.

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[17] I am not certain about the best way to state the necessary constraint. At least one can say that a phonotactic constraint such as *ki/k_k is not unmotivated for Quechua. Suffixes often begin with a consonant cluster (-rqa, -sqa, -qti, -nku, -ntsik) or glide-consonant (-yka, -ykacha, -yku), which leads to integration into the preceding syllable. For breaking unwanted clusters, Quechua makes use of the epenthetic syllable *ni* (Ancash *rika-r-yki* → [ri.kar.**ni**(y).ki] 'when I see you', with the 'same subject' marker /r/), which, however, does not apply here, for whatever reasons.

b.

	2p→1p	*pl-pl	*(+hr)/–lp	*iy/k_k	MAX(pl)/1	MAX(+hr)/1	MAX(pers)	MAX(pl)/2	MAX(+hr)/2	MAX(pl)/3
☞	-wa-yku -1A-1p						*	*		
	-wa-chis -1A-pl/2			*!			*			
	-wa-yku-chis -1A-1p-pl/2	*!					*			
	-wa-nki-chis -1A-2-pl/2			*!						
	-wa-nki-yku -1A-2-1p			*!				*		

With 1p objects, *-wa-yku* is the winner. I assume that the more explicit *-wa-nki-yku* is also ruled out by *iy/k_k.

c.

	3p→2p	*pl-pl	*(+hr)/–lp	*iy/k_k	MAX(pl)/1	MAX(+hr)/1	MAX(pers)	MAX(pl)/2	MAX(+hr)/2	MAX(pl)/3
☞	-sunki-chis -3→2-pl/2								*	*
	-sunki-nku -3→2-3p							*!	*	
	-sunki -3→2							*!	*	*
	-su-chis -2A-pl/2						*!			*

Here, *su-n-chis* would be better than *sunki-chis*, but it looses in terms of number of morphemes. [18]

d.

	3p→2s	*pl-pl	*(+hr)/–lp	*iy/k_k	MAX(pl)/1	MAX(+hr)/1	MAX(pers)	MAX(pl)/2	MAX(+hr)/2	MAX(pl)/3
☞	-su-nku -2A-3p									
	-sunki-nku -3→2-3p								*!	
	-sunki -3→2								*!	*

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[18] Recall that *yki* (1→2) doesn't violate *(+hr)/–Lp because it is a portmanteau morpheme, therefore, it must violate MAX(+hr)/+2. Similarly, *sunki* (3→2) violates MAX(+hr)/+2, whereas *su-nki* does not. The portmanteau form *sunki* appears in Cuzco and all more southern varieties of Quechua; this form always follows tense (V-PAST-*sunki*), while a separate object marker precedes tense (V-*su*-PAST-*nki*). Obviously, MAX(+hr)/+2 ranks low enough to be dominated by MIN(μ) 'Minimize the number of morphemes in an inflectional form', which itself ranks rather low.

The examples given in (40) above (section 5) illustrate other inflectional paradigms of Quechua in which the two persons involved in 1p→2p are overtly expressed. These varieties have developed other constraint rankings. However, it seems that Cuzco 2 shares with Cochabamba the partial ranking *pl-pl, MAX(+pl)/+1 » MAX(+pl)/+2. Cochabamba belongs to the more southern varieties that have developed a special 1p marker (*yku*), but forbids the sequence *yki-yku* for expressing 1p→2p, while Cuzco 2 allows *-yki-ku* in this case. I have assumed that *iy/k_k accounts for this difference; if that is true, syncretism (which is always combined with certain gaps) is not only dependent on constraints relating to the involved categories, but can also result from the interaction with purely phonological factors.[19]

7. Conclusions and discussion

7.1   This study gives us four empirical insights. First, syncretism not only results from poverty in the inventory of affixes, but often also from the interaction of faithfulness and alignment constraints. Deviating from syntactic constructions, inflectional forms have to obey strict ordering principles. In the case of conflict, the last resort in the inflectional morphology is not any movement, but syncretism (which is often accompanied by additional forms in the syntax).

Second, inflectional forms can be subject to the specific restriction that certain types of affixes should appear only once (expressed by constraints such as SINGLE PREFIX or SINGLE PLURAL); analytical forms do not depend on such a restriction. The restriction to a single affix forces the development of selection preferences. As we have seen, mainly three factors play a role in the inflectional encoding of arguments: person, number, and grammatical role (i.e., the position in the argument hierarchy); these factors must be weighed to each other.

Third, beyond the three major types of morphological constraints (faithfulness, markedness, and alignment), distinctivity constraints play some role, too. *O-IDENT(+1,+2) is one of these constraints; a syncretism between 1st and 2nd person is rather rare. Another, even more important distinctivity constraint is *O-IDENT($\alpha{\rightarrow}\beta$, $\beta{\rightarrow}\alpha$). This constraint leads (as every constraint) to the *emergence of the unmarked*, which in this case can be the direct/ inverse marking as in Algonquian, or case-marking as in other languages. This general constraint can also be reflected as in Quechua, where case-marking exists, by a morphological constraint that restricts the presence of object (accusative) markers to inverse settings.

Fourth, all languages of this study display a somewhat mixed system, which includes portmanteau morphemes, some reflections of direct vs. inverse, and some reflections of accusative. The inverse markers seem to have developed from portmanteau morphemes by generalization, and accusative seems to have developed either directly from portmanteaus or from the more general direct/inverse morphemes by generalization. Interestingly, the conjunct forms in Algonquian are more under pressure to develop accusative than the independent forms. As soon as accusative has arisen, the dependence on person could be minimized, but Quechua (the only language of our sample that has accusative on nouns, and accusative affixes on the verb as well) shows that this must not be the case. Apparently, the considered systems are in the process of reorganization (which, of course, can always be

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[19]   Gerlach (2002) describes some examples in the Romanian clitic sequences, in which gaps appear on phonological grounds. Some of these gaps do not lead to syncretism because a less specific clitic is substituted. Similar examples in Yimas (New Guinea) are considered by Wunderlich (2001).

said about grammatical systems), which can lead to unexpected new syncretism. But in none of these systems is the slightest indication of a reduction of inflectional morphology.[20]

7.2   The studies of this article have followed the principles of Minimalist Morphology (Wunderlich & Fabri 1995, Wunderlich 1996a,b). One question often addressed to me is: Why are you concerned with minimalism in the morphology? Isn't this a very idealistic way of approaching inflectional morphology, if, as it turns out again and again, inflectional forms, as well as whole paradigms, are often rather bizarre? Shouldn't we assume a more powerful framework? There are two answers, a methodological one and an ontological one.

First, minimalism is fruitful as a methodical guide: Use the most simple and decomposed concepts, as long as you can avoid the more complex ones. If a hearer of my lecture objects that Heath (1991, 1998) was already arguing that 1st/2nd person combinations are principally subjected to pragmatic skewing, he seems to accept that sociolinguistic considerations have to enter the description of grammar. I do not deny the possibility that this is necessary (and discussed this problem in my paper on Yimas (Wunderlich 2001a) to some extent), but if there is a more straightforward account possible in simple structural terms, I would prefer this. Why do we find these disguises in morphology and not so much in syntax? This problem cannot be solved by pragmatics. I think we should feel blessed if purely structural factors such as competing alignment requirements can be found.

Second, minimalism claims to account adequately for the nature of linguistic entities and processing, in other words, it attempts to be serious regarding the way in which the human brain works. All the principles that follow may guide the human language processor (especially that of a language learner) because they simplify the task of memory and neuronal processing:
- Minimize the size of lexical forms by decomposition.
- Minimize the number of lexical entries by avoiding polysemy.
- Minimize the information these lexical entries bear by underspecification.
- Minimize the types of operations apart from concatenation.
- Minimize the number of both features and constraints so that the compositional architecture remains small.
- Minimize the contexts in respect to which inflectional forms have to be interpreted.

In order to account for problems similar to those addressed in this article, two different types of mechanism have been proposed in the literature.

Gaps occurring in the inventory or in the forms are accounted for by ***impoverishment rules*** (Bonet 1991, Halle & Marantz 1993, Noyer 1998), saying that a certain category in a certain context should not be expressed (such as, viewed in the problems discussed here: 'No 3rd person object marking!', 'No 2nd person marking in the presence of a 1st person!'). It is not excluded that a particular gap results from just one constraint, which then functions

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[20]   Imbambura Quechua (QI), spoken in northern Ecuador, has lost most object marking, except -*wa* (1sA), and the subject marking has been reduced, with -*chij* (p/loc) being the only plural marker.

Subject markers	1	2	3
sg	-ni	-ngui	-n
pl	-n-chij	-ngui-chij	

But Imbambura has also borrowed or reanalyzed many more features in the contact with Spanish (raising, passive, dative), see Jake (1985).

like an impoverishment rule, but it is also possible that a gap results from the interplay of several constraints. Gaps in inflectional forms can also arise from the lack of morphological positions (e.g., if one tries to express more than one plural in a word). Obviously, impoverishment rules are too strong a device.

Syncretism arising from a restricted lexical inventory or from preferences in filling a gap is accounted for by ***rules of referral*** (Zwicky 1985, Stump 1993, 2001), saying that the exponent of another paradigmatic cell should also be used in the cell under consideration (such as: 'Use the nominative form also in the accusative!', 'Use the singular form also in the plural!'). The problems with these rules is that they are hardly detectable, not only because the respective source forms must have been learned before but also because the concept of a lexical entry becomes blurred. In their essence, rules of referral claim output-identitity between different cells of a paradigm, which is a much stronger concept than *output-identity, a concept that is used in distinctivity constraints. ('Be different!' is easier to follow than 'Be identical!')

7.3   The overall theoretical perspective I am advocating could be abbreviated as ***Lexicon and Constraints (LC) account***. All inflectional forms are decomposed into minimal units stored in the lexicon (or memory), and all combination of these units is controlled by general constraints. In a constraint-based approach, the derivational (or rule-governed) processes are less important than the selection of optimal forms ('You can produce everything you want, but before you utter it, make some control!'). Evidently, such an approach need not be restricted to inflectional morphology, and, indeed, OT syntax is inspired by a very similar view. It is reasonable to base the distinction between morphology and syntax not on any fundamentally different principles. Syntax is more effective than morphology because it allows for positional alternatives, consequently, focus and topic can be expressed, among others. But this does not mean that the composition of complex word forms and the composition of syntactic phrases are totally different.

In the LC account, paradigms are a product that arises by systematic variation of features such as person and number. In a similar way, sentences that arise by systematic variation of syntactic features such as focus and topic can be ordered into paradigms. Let us assume a language with the neutral word order VSO, a preverbal focus position, and a sentence-initial topic position. The resulting word orders can then be ordered as in (45).

(45)   Topic and focus positions in syntax

O\S	+foc	+top	neutral
+foc		SOV	OVS
+top	OSV		
neutral	SVO		VSO

This 'paradigm' shows two instances of syncretism, which can only be resolved by further means, such as morphological case on the argument expressions. If we assume as a natural bias that subjects are more likely to be topics, and objects more likely to be focused, both SVO and OVS get a preferred reading. The example illustrates that paradigms are possible in syntax, too; in syntactic paradigms, information status (focus, topic) could have a similar role as person in inflectional paradigms. It is also obvious that syntactic paradigms are epi-phenomena.

The question, then, is: ***Why do we need paradigms***? My answer is: the child needs them.[21] In the process of language acquisition, the child memorizes complex word forms holistically, and relates them to certain settings. Later, when he or she detects similarities and contrasts between forms, he starts to reanalyze the memorized chunks into smaller units. The paradigmatic contrasts help the child (i) to identify the morphemes ('affixes') and to specify their lexical entries, and (ii) to find the constraints that force underspecification of forms, and allow for the proper selection of affixes. As soon as this knowledge is acquired, paradigms become unnecessary objects because every form to be uttered can be calculated unidirectionally. (Note that highly irregular word forms, including suppletions such as those for *to be*: {*am, is, are, was, were*}, very low-frequent word forms, and word forms belonging to a small lexical class may remain unanalyzed.)

Slightly different is the situation with syntactic paradigms. Not only that S,V,O sequences usually are much larger sequences than words and are therefore not memorized holistically, at the time when the child distinguishes positions of syntactic subject and object he will have already acquired a lot of grammar. In principle, however, the acquisition of focus and topic position has to rely on the contrast between sentences, quite similar to the acquisition of person morphemes in inflectional morphology.[22]

If one considers minimalism to be a design property of the human language processor, paradigms, being rather complex and often bizarre objects, should not be in the focus. Although paradigms may play an important role in the learning phase, the child nevertheless seeks to become independent of them as soon as possible. The LC framework I have used in this article votes for such a perspective.

7.4   Some other accounts of inflectional morphology suggested in the literature differ radically from the LC account, and they fail in the minimalist perspective. In the word-based, especially in the ***word and paradigm (WP) account*** (Robins 1959, Matthews 1972, and similarly also Anderson 1992, Stump 2001), it is assumed that the lexicon consists of 'lexemes' associated with word form paradigms, and that each word form is determined by a function that alters some phonological material of a leading word form (e.g., by adding phonological material), in analogy to exemplary paradigms. In my view, this account rather reflects the situation of the language learner; it misses the fact that more abstract lexical items (such as affixes) could be derived on the basis of paradigms. A grammar is the product and not a stage of language learning. It is hard to see how certain parts of a word form (such as stem-adjacent *-i-* in Ojibwa, see (33) and (34)) can ever shift their function (from inverse 2→1 to 2A) if they are not considered as separate morphemes. In the Quechuan dialects, the sequence *-su-nki* (A-2), which can be separated by a past morpheme, must be distinguished from the fused morpheme *-sunki* (3→2), which can only follow the past morpheme (see fn. 18). That is, speakers of different varieties decompose one and the same phonological sequence differently. Is is hard to see how to deal with this fact without a concept of segmentation into morphemes.

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[21]   This is not a new answer; I heard it 15 years ago from Lauri Karttunen.

[22]   Again, there are some differences. Cross-linguistically, topic is preferred in sentence-initial position, while a specific person is not preferred in a particular word position. But there are genuine analogies. Cross-linguistically, non-emphatic imperatives lack the expression of 2nd person, similarly to the fact that non-contrastive topics can be dropped. Morphology and syntax often share the ordering mood > tense > aspect, with the lower category being nearer to the verbal stem than the higher one, or following the higher category in analytic constructions.

For the paradigms considered in this article (especially those of the Algonquian verb) it is not evident what the leading word form is (perhaps, 3prox→3obv), and whether exemplary paradigms have any further function. The inflection classes are characterized by the features 'transitive/ intransitive', and 'animate/inanimate object', already reflected in the verbal stem. The association between 'lexemes' and exemplary paradigms reduces to the statement that transitive verbs have more arguments than intransitive ones, and that only animate arguments can vary in person.

The WP account rejects any similarities between inflectional morphology and syntax, seen as generative systems.[23] Thus it is unclear how it deals with transitional phenomena, such as the integration of former clitics into the word. Do they loose their morpheme status?

The WP account also makes no difference between regular word forms (decomposed into stems and affixes) and irregular word forms (memorized). Only when the word forms are decomposed, the resulting affixes can be used productively with new words, and children may overregularize them; the WP account does not give us any predictions about productivity and overregularization. One has also to ask how the processing differences between memorized word forms and decomposed word forms come about in the WP account; decomposable word forms show the same priming effects as stems, while memorized word forms do not (Stanners et al. 1979). Lexical decision experiments have shown that the reaction times regarding memorized word forms depend on their frequency, while reaction times regarding decomposed word forms do not.[24] Based on multiple experimental data of this kind, psycholinguists have argued for a dual-mechanism approach to inflection (Pinker 1991, Clahsen et al. 1992, Clahsen 1999, Penke 2002).

Another problematic approach to inflectional morphology is the ***inflection class feature (ICF) account***, first proposed by Corbett (1982), who considered the gender of nouns to be derivable from inflection class features (rather than the other way around), which associate nouns with paradigms. In many Indo-European languages, a distinction can be made between a-stems, o-stems, consonantal stems, etc., which are combined with different endings and thus result in different paradigms. Traditionally, these different paradigms are often numbered as 1st conjugation/declination class, 2nd class, and so on. Unlike gender, inflection class features do not play any role in the syntax; they are not interpretable as semantic or grammatical functions. Müller (2003) assumes that inflection class features are decomposed into abstract feature sets such as $[\pm\alpha,\pm\beta,\pm\gamma]$ (depending on how many classes have to be distinguished). Each individual noun or verb stem is characterized by one of these feature combinations, and the affixes they can be combined with are specified for some of these features. This variant of the ICF account avoids any direct association of inflection class features and paradigms, but it burdens much to the lexical entries. The more minimalist way would be to assume subcategorial and phonological variation, as well as lexicalized (memorized) forms, in order to capture inflectional classes within a category. Until now, I have not seen any convincing empirical argument for the necessity of assuming inflection class features. But even if such arguments could be given for Indo-European languages, it is very unlikely that abstract inflectional classes constitute a universal factor of inflectional morphology.

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[23] The WP account could be congruent with construction grammar (Fillmore et al. 1988, Goldberg 1995), a theory that regards syntactic constructions to be models for newly formed sentences.

[24] For instance, German *-er* plural nouns (*Kind-er* 'children') have been shown as irregular (memorized), in contrast to *-s* plural nouns (*Auto-s* 'cars'); similarly, German *-n* participles (*ge-seh-en* 'seen') have been shown as irregular, in contrast to *-t* participles (*ge-lach-t* 'laughed').

There are also purely surface-oriented approaches to morphology. Inflectional forms can be arranged according to the types of vowels, consonants, and syllables, which are added to the stem. The principle of iconicity predicts that the more complex phonological exponents are associated with more complex functions. However, iconicity in this sense is a gradual property, which cannot make a distinction between orthogonal functions, such as 1st and 2nd person, or subject and object. It is also doubtful whether a child memorizes the whole paradigm in order to find iconic mappings between form and function, or rather starts with some <form, function> analysis in the more frequent items, and then progresses to the less frequent ones. It is plausible that the child attacks the more complex and less frequent forms with some already-acquired pre-knowledge. Thus, probably, no language learner will ever notice the abstract surface structure of paradigms.

7.5   A last problem to be addressed concerns bidirectionality. Paradigms often show a balanced structure, in which some distinctions are preserved and others are ignored. As I pointed out in section 2, a form such as *gleda* 'look' (Macedonian) does not show its function by itself; that it can get the interpretation '**you**/he/she looked' results from the contrast with other cells of the paradigm. Similarly, that *wābam-igw-an* (see-INV-2s, Ojibwa) receives the interpretation '**We** see you', or that *rikhu-yku* (see-1p, Cochabamba) receives the interpretation 'We see **you**/him' cannot be predicted on the basis of what is expressed. In general, the interpretation of forms is relative to a paradigm. Bidirectional OT assumes an interplay of constraints to find for each function the optimal form and for each form the optimal interpretation; the algorithm that performs this calculation, produces paradigms. But is it necessary to include the hearer-perspective? Only if it is, paradigms might be accepted as genuine theoretical objects.

Interpretations are restricted by such constraints as 'Do not give any form the interpretation 1s and 2s'. As I have argued in section 2, these interpretive constraints can be formulated as *O-IDENT constraints in a unidirectional theory; it is these constraints that avoid too much overlap of forms. Both the hearer's interpretation (o') and the intended reading (i) can be more specific than what is overtly expressed (o); hence, $o \subseteq o'$ and $o \subseteq i$; but this scenario bears the risk of misunderstanding. The best way to guarantee that o' and i are identical (or, at least, that $o' \subseteq i$) is to base the interpretation on the principles that generate the optimal form. That is, the hearer will be most successful if he imitates the speaker-perspective. With respect to phonology, already Liberman (1957) argued that perception also uses motoric skills. Therefore, phonological features are usually specified in terms of articulatoric gestures rather than in terms of auditory properties. If one extends this view to morphology, the grammar would be freed from the non-minimalist notion of inflectional paradigm.

In dispensing with a separate hearer-perspective one may also get support from neurological studies. Rizzolatti et al. (1996) discovered the so-called mirror-neurons: if an ape observes another ape who is handling some object in the way an ape usually treats food, a part of his motoric brain area gets activated, so as if he would imitate the hand movements. Reflecting these observations, Rizzolatti and Arbib (1998) established the mirror-neuron hypothesis in order to provide the missing link for understanding the origin of gestural (and possibly also sound) language, namely why hearers can ever be successful in their interpretations. According to this hypothesis, the function of mirror-neurons has been widely extended in the development of the human brain, covering also communicative (intended) actions. If this is true, the neuronal system dictates how the best interpretation is found, and one does not need a theory about hearer-perspectives, and consequently, neither a theory of

paradigms.

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